U. S. Department of Transportation
Docket Operations
West Building Ground Floor, Room W12-140,
1200 New Jersey Ave., SE,
Washington, DC 20590

July 12th, 2021

Request for Exemption under Part 11 of the Federal Aviation Regulations from 14 C.F.R. 107.36, 14 C.F.R. 137.19(c), 14 C.F.R. 137.19(d), 14 C.F.R. 137.19(e)(2)(ii), 14 C.F.R. 137.19(e)(2) (iii), 14 C.F.R. 137.19(e)(2)(v), 14 C.F.R. 137.31(a), 14 C.F.R. 137.31(b), 14 C.F.R. 137.33(a), 14 C.F.R. 137.33(b), 14 C.F.R. 137.41(c), 14 CFR § 137.41(c), 14 C.F.R. 137.42, and 49 C.F.R. 175.9(b)(1).

Petition for Exemption

Dear Sir or Madam,

Dakota Unmanned Aerial hereby applies for an exemption from certain provisions of 14 C.F.R. 107, 14 C.F.R. 137, and 49 C.F.R. 175 to operate an unmanned aircraft system (UAS) for commercial agricultural-related services. This request is for a single pilot per UAS operation. The relief requested is similar to that granted in Exemption No. 11448 to Yamaha Motor Corporation, USA. Dakota Unmanned Aerial intends to operate a UAS under the 55-pound limit of 14 C.F.R. 107. Dakota Unmanned Aerial will utilize UAS to dispense materials including hazardous material and restricted use pesticides. Moreover, Dakota Unmanned Aerial does not require the extensive operating exemptions and limitations contained in Exemption 11448 granted pursuant to Section 333 because Dakota Unmanned Aerial will be operating within the parameters of 14 C.F.R. 107.
Dakota Unmanned Aerial asks the FAA to grant its petition because (A) granting the request would benefit the public as a whole and (B) granting the exemption will not adversely affect safety because the exemption will provide a level of safety at least equal to the existing rules.

Petitioner's Contact Information:

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Regulations from which exemption is requested:

- 14 C.F.R. 107.36, Carriage of Hazardous Material
- 14 C.F.R. 137.19(c), Certification Requirements, Commercial Operator - pilots
- 14 C.F.R. 137.19(d), Certification Requirements; Aircraft
- 14 C.F.R. 137.19(e)(2)(ii), Certification Requirements; Knowledge and skill tests; skills; approaches to the working area. 14 C.F.R. 137.19(e)(2) (iii), Certification Requirements; Knowledge and skill tests; skills; flare-outs
- 14 C.F.R. 137.19(e)(2)(v); Certification Requirements; Knowledge and skill tests; skills; pullups and turnarounds
- 14 C.F.R. 137.31(a), Aircraft Requirements; Certification Requirements
- 14 C.F.R. 137.31(b) Shoulder Harnesses
- 14 C.F.R. 137.33(a), Carrying of certificate; Certificate carried on the aircraft.
- 14 C.F.R. 137.33(b) Registration and airworthiness certificates available.
- 14 C.F.R. 137.41(c), Personnel; Pilot in Command; Commercial certificate
- 14 CFR § 137.41(c), Personnel; Pilot in command; demonstration of knowledge and skills.
- 14 C.F.R. 137.42, Fastening of safety belts and shoulder harnesses.
- 49 C.F.R. 175.9(b)(1), Special Aircraft Operations; Exceptions; Agricultural Operations
- 49 USC 44807, Special authority for certain unmanned aircraft systems

Business Model:

Dakota Unmanned Aerial is a sole proprietorship conducting agricultural operations in Eastern South Dakota. Dakota Unmanned Aerial provides crop protection on a wide range of crops with sub-inch application precision. UAS services will expand farmers capabilities to further pursue the safest, most effective and economically efficient crop care solutions for their operations.

The Extent of Relief the Petitioner is Seeking:

The Petitioner proposes these restrictions and believes that these limitations provide an equivalent level of safety, if not greater, as the FAR's presently impose upon the Petitioner. Each of the regulations above will be talked about in greater detail in another section of this petition.

These limitations and conditions are equal to Exemption # 17261 except as noted below. The list of limitations and conditions include the following:

1. Operations authorized by this grant of exemption are for unmanned aircraft system (UAS) model with a maximum takeoff weight of less than 55 pounds, including everything that is on board or otherwise attached to the aircraft.

2. When adding any UAS or new UAS models that will be operated under this exemption, the operator must notify the Flight Standards District Office (FSDO) which holds their operating certificate. Additionally, operations authorized by this exemption are limited to the UAS listed on the operator's part 137 Letter of Authorization (LOA).

3. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the Conditions and Limitations in this exemption, any applicable FAA-issued waivers /authorizations, and the procedures outlined in the operating documents, the most restrictive conditions, limitations, provisions, or procedures apply and must be followed. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The General Aviation and Commercial Division, (AFS-800) may be contacted if questions arise regarding updates or revisions to the operating documents.

4. Any UAS used by the operator that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g. replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a remote PIC with a Visual Observer (VO) and other personnel necessary to conduct the functional flight test (such as a mechanic or technician). The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

5. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

6. PIC qualifications: The remote PIC must demonstrate the ability to safely operate the UAS in a manner consistent with how it will be operated under this exemption, including the applicable knowledge and skills requirements for agricultural aircraft operations outlined in 14 CFR part 137, evasive and emergency maneuvers, and maintaining appropriate distances from persons, vessels, vehicles and structures before operating non-training, proficiency, or experience-building flights under this exemption.

7. For UAS operations where Global Positioning System (GPS) signal is necessary to safely operate the UA, the remote PIC must immediately recover/land the UA upon loss of GPS signal.

8. If the remote PIC loses command or control link with the UA, the UA must follow a pre-determined route to either reestablish link or immediately recover or land.

9. The remote PIC must abort the flight operation if unpredicted circumstances or emergencies that could potentially degrade the safety of persons or property arise. The remote PIC must terminate flight operations without causing an undue hazard to persons or property in the air or on the ground. Documents the operator must retain under §§ 107.13, 137.33, and in accordance with this exemption (including but not limited to: operators' exemption, any waiver held, a facsimile of the agricultural aircraft operator certificate, training manual, operations manual, and registration certificate) must be available to the remote PIC at the Ground Control Station of the UAS at all times the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request. Airworthiness certificates applicable to the UAS to which this exemption applies are not required for compliance with this condition.

10. The relief granted from § 107.36 is limited to the use of any economic poison as defined in § 137.3.

11. The remote PIC may operate the UAS from a moving device or vehicle if such operation is in sparsely populated areas.

12. This exemption will not be valid for operations outside of the United States.

Reasons why the Petitioner is seeking relief from the regulations and why the exemption would provide equivalent safety:

1. 14 C.F.R. § 107.36 Carriage of Hazardous Material. Section 107.36 says, "A small unmanned aircraft may not carry hazardous material. For purposes of this section, the term hazardous material is defined in 49 CFR 171.8." Some of the chemicals that need to be dispensed during agricultural aircraft operations may be classified as hazardous material. Because this regulation is not waivable under 107.205, we are requesting an exemption from it. An equivalent level of safety can be achieved by requiring the Petitioner to maintaining Part 137 standards and operations, use pilots who have a remote pilot certificate, follow any and all restrictions placed on the agricultural aircraft operator certificate, and limit the hazardous material being carried to only economic poisons. The requirement to use only FAA-certificated remote pilots also alleviates any security concerns as the TSA would have already done a background check on the individual possessing the pilot certificate.

2. 14 C.F.R. §§ 137.19(c), 137.41(c) Pilot in Command. Section 137.19 paragraph (c) says, "Commercial operator—pilots. The applicant must have available the services of at least one person who holds a current U.S. commercial or airline transport pilot certificate and who is properly rated for the aircraft to be used. The applicant himself may be the person available." Section 107.41 paragraph (c) references back to 137.19. These regulations are burdensome and unnecessary. As found in the previously granted exemptions, an equivalent level of safety of the regulations can be achieved by requiring a remote pilot certificate, operations to be done in accord with Parts 107 & 137, an agricultural aircraft operations certification be obtained prior to operations, and the proposed restrictions in this exemption.

3. 14 C.F.R. § 137.19(d) Aircraft Section 137.19 paragraph (d) says, "The applicant must have at least one certificated and airworthy aircraft, equipped for agricultural operation." Unmanned aircraft operated under Part 107 do not have any aircraft certification requirements. Under Part 107, the remote pilot in command is responsible for determining if the aircraft is airworthy. The requirements contained in the manufacturer's manuals, the requirement in Part 107 for the remote pilot to conduct pre-flight inspections of the aircraft, and having an existing operator certificate will be, in total, sufficient for determining the airworthiness of the aircraft which provides an equivalent level of safety as the regulations for agricultural aircraft operations. Moreover, the Petitioner is the one best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety as the regulations.

4. 14 C.F.R. § 137.19(e)(2)(ii), (iii), and (v) Skills Test Section 137.19 paragraphs (e)(2)(ii), (iii), and (v) are unnecessary and not applicable for unmanned aircraft. As the FAA stated in Exemption 17261, "the FAA has determined that demonstration of the skills described in these paragraphs is not necessary because they are not compatible or applicable to" agricultural aircraft operations with multi-rotor unmanned aircraft. Therefore, relief should be granted to agricultural aircraft operations that utilize fixed-wing and UAS. An equivalent level of safety can be obtained by requiring the remote pilot to have a valid remote pilot certificate, and requiring that operations must be done under the proposed restrictions of this petition.

5. 14 C.F.R. § 137.31(a) and (b) Aircraft Requirements. Section 137.31 says, "No person may operate an aircraft unless that aircraft— (a) Meets the requirements of §137.19(d); and (b) Is equipped with a suitable and properly installed shoulder harness for use by each pilot." As discussed above, unmanned aircraft operating under Part 107 do not have any aircraft certification requirements. Furthermore, all of the unmanned aircraft do not have shoulder harnesses for use by the pilot and none could comply with 137.31(b). Installing a shoulder harness would not provide any added safety benefit. The requirements contained in the manufacturer's manuals, the requirement in Part 107 for the remote pilot to conduct pre-flight inspections of the aircraft will be in total sufficient for determining the airworthiness of the aircraft which provides an equivalent level of safety as the regulations for agricultural aircraft operations.

6. 14 C.F.R. § 137.33 Carrying of Certificate. Section 137.33 paragraph (a) requires the agricultural aircraft operator certificate be carried on the aircraft. Additionally, paragraph (b) requires the airworthiness certificates to be available for inspection at the base. A similar situation was addressed in the FAA legal opinion letter of Mark Bury to John Duncan on August 8, 2014 where the FAA general counsel's office answered whether registration and airworthiness documents must be carried aboard an unmanned aircraft. Mr. Bury said, "we find that the intent of these regulations is met if the pilot of the unmanned aircraft has access to these documents at the control station from which he or she is operating the aircraft." Likewise, the Petitioner here proposes to keep the agricultural aircraft operator certificate and registration all at the ground station. These documents can be available for inspection by the FAA or law enforcement. This all provides an equivalent level of safety as the regulations. Additionally, the Petitioner needs relief from paragraph (b) because operations under Part 107 do not require an airworthiness certificate and it would be extremely burdensome to acquire an airworthiness certificate to comply with this paragraph of the regulation. An equivalent

level of safety can be reached by requiring the aircraft be flown with no persons on board.

7. 14 C.F.R. § 137.41(c) Pilot in Command. Section 137.41 paragraph (c) says, “No person may act as pilot in command of an aircraft unless he holds a pilot certificate and rating prescribed by §137.19 (b) or (c), as appropriate to the type of operation conducted. In addition, he must demonstrate to the holder of the Agricultural Aircraft Operator Certificate conducting the operation that he has met the knowledge and skill requirements of §137.19(e). If the holder of that certificate has designated a person under §137.19(e) to supervise his agricultural aircraft operations the demonstration must be made to the person so designated.” An exemption is needed from this regulation based upon the same reasons listed above for Section 137.19 (c) and for Section 137.19(e)(2)(ii)-(v). An equivalent level of safety can be provided by the proposed restrictions listed herein that have already been determined by the FAA in Exemption 17261 to provide an equivalent level of safety as the regulations. Additionally, all of the pilots in command will obtain a remote pilot certificate and have passed company training.

8. 14 C.F.R. § 137.42 Fastening of Safety Belts and Shoulder Harnesses. Section 137.42 says, “No person may operate an aircraft in operations required to be conducted under part 137 without a safety belt and shoulder harness properly secured about that person except that the shoulder harness need not be fastened if that person would be unable to perform required duties with the shoulder harness fastened.” This regulation is designed to protect people on board the aircraft. Since there are no people on board, whether we follow it or not, the impact on safety is the same. However, because the law requires it, we require an exemption from this regulation. Therefore, an equivalent level of safety can be achieved by flying under the proposed restrictions herein.

A. Reasons why granting this petition would be in the public’s interest:

1. Dakota Unmanned Aerial’s intent is to aerially apply Restricted Use products at the request of local agricultural growers. Without pesticides, a reduction of more than 50% in yield would result. The utilization of aerial application is a pivotal means for application to mitigate soil compaction and crop damage due to equipment in the field. Without aerial application, growers *will* experience a reduction in yield. Dakota Unmanned Aerial is committed to serving its community with the safest, most effective means of aerial application.

2. Public safety is the utmost concern at Dakota Unmanned Aerial. Utilizing UAS, improvements can be made to increase public safety during aerial pesticide applications, while reducing the total volume of chemicals being sprayed. This will be accomplished by utilizing RTK GPS guidance to ensure precise application of products. Dakota Unmanned Aerial will utilize UAS to aerially apply products to any crop a producer requires with precision and accuracy. UAS applications are not replacing large ground rigs or planes, but will supplement their operations and will increase public safety.

3. Drift mitigation in small, confined areas can be accomplished effectively with UAS. Application height above the crop is a crucial aspect of drift mitigation. In some cases, fixed-wing aircraft are unable to descend to the appropriate spray height when field size constraints exist. UAS have the ability to apply product in hard-to-reach areas at an appropriate height to reduce the potential for drift. It would be in the public's best interest to reduce the potential for drift.

4. In noise-sensitive areas, such as around livestock, manned aircraft in some cases can produce disruptive noise levels. In general, UAS are quieter and the public will benefit from a reduction in noise pollution in sensitive areas.

B. UAS and risk mitigation:

1. Unmanned Aircraft System (UAS)
The petitioner will use the DJI MG-1 specifications for both UAS
- • DJI MG-1

DJI MG-1 Specifications:
- • Max T/O Weight: 54.0 lbs
- • Max Thrust/Weight: 1.7
- • Aircraft - 22 lbs - (frame, motors, blades, flight controllers, 10L carbon-fiber tank, pump, sprayer tubes and nozzles and mounts).
- • Payload - 22 lbs - (10L of liquid)
- • Batteries – 8.8 lbs
- • Max Power Consumption: 6400 W
- • Hovering Power Consumption: 3250W @ Max T/O weight
- • Hovering Time: 9 Min @ Max T/O weight
- • Max Tilt Angle: 15 degrees
- • Max Flight Speed: 43.7 kts
- • Service Ceiling: 6561 ft
- • Operating Temperatures (recommended): 32-104 Deg F.

The aircraft uses 21" high-performance engineered plastic 2 blade props. The maximum horizontal diameter is 5’. Its height is 19 inches tall.

Risk mitigation:

1. Risk: UAS Lost Signal, UAS Low Battery, UAS Lost Visual Line of Sight.
    a. Mitigation: In the UAS, Aura LLC utilizes DJI OccuSync 2.0, the software programming comes with the flight smart controller, which contains a Return to Land (RTL) feature which will navigate the UAV to a certain RTL altitude, then transport the UAV to the location of takeoff, unless overridden with a new home location.

The UAV control is then returned to the pilot to land. RTL activates in the case of:

I. Loss of RC Signal
II. Low Battery
III. RTL can be activated at any point by the pilot, such as loss of visual line of sight or loss of control of the UAV.

b. Mitigation: In the UAS, Dakota Unmanned Aerial uses a DJI App built into the flight smart controller which has the same features as those described above.

2. Risk: Flight over unwanted area: a. Mitigation: Use of DJI Occusync 2.0 and mission planning software called DJI Occusync 2.0. Mission Planner permits it to create geofenced areas that prohibit flight paths over unwanted terrain. Moreover, the UA will remain in VLOS. The operator will manually control the UAS to avoid flight over unwanted areas as needed.

3. Risk: Failure of mission planner software: a. Mitigation: Operators can manually take control of the UAS at any given time. The industry standard DJI model controller includes a toggle switch to transition from programmed to manual flight control. This permits operators to observe the UAS in flight and take over for any reason.

4. Risk: UAS Flyaway a. Mitigation: Flyaways can occur for a variety of reasons, most commonly UAS misconfiguration (compass), lack of following pre-flight checklist (setting RTL location/home), or operator error. Risk mitigation is achieved through the ability to take control of the UAS at any time using the radio controller as described above.

b. Mitigation: The flights are conducted in areas that are rural and remote. This minimizes any significant risk of damage due to UAS flyaway. Due to the UAS limited flight time and range the UAS won't travel significant distances.

Federal Register Summary:

As required by 14 C.F.R. Part 11, below is provided a summary of the petition to be published in the Federal Register should it be determined that publishing is needed.
The Petitioner is seeking an exemption from the following rules:
14 C.F.R. §§ 107.36; 137.19(c) and (d); 137.19(e)(2)(ii), (iii), and (v); 137.31(a) and (b); 137.33(a) and (b); 137.41(c), and 137.42 to operate an unmanned aircraft, weighing less than 55 pounds, commercially for agricultural aircraft operations.
This exemption is needed because the listed regulations are extremely burdensome to operate under while conducting agricultural aircraft operations under the Federal Aviation Regulations. The proposed restrictions contained in the petition and manuals will provide an equivalent level of safety as the regulations.

Operating Documents:
The Petitioner is providing the following information along with its petition to support its request for an exemption.

1) DJI MG-1 user manual

Statutory authority to grant this petition:
The Federal Aviation Act gives the FAA the authority to grant exemptions. “The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator finds the exemption in the public interest.”*
* 49 U.S.C. § 44701(f); accord 49 U.S.C. § 44711(b).
Reference material faa docket no. FAA-2020-0382, FAA-2021-0036-0001, FAA-2018-0096-0005

Conclusion:

The operation of Dakota Unmanned Aerial using a UAS, weighing less than 55 lbs., for agricultural aircraft operations, conducted under the proposed restrictions outlined above, will provide an equivalent level of safety as the burdensome regulations; therefore, this petition should be granted without delay.

If I can be of any assistance, please do not hesitate to contact me at (605)641-2479 or at my email dverhelst24@hotmail.com.

Best Regards,

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